

CLAIMS

1. A hybrid polypeptide comprising:

(a) a starch-encapsulating region;

(b) a payload polypeptide fused to said starch-encapsulating region.

5 2. The hybrid polypeptide of claim 1 wherein said payload polypeptide consists of not more than three different types of amino acids selected from the group consisting of: Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val.

10 3. The hybrid polypeptide of claim 1 wherein said payload polypeptide is a biologically active polypeptide.

4. The hybrid polypeptide of claim 3 wherein said payload polypeptide is selected from the group consisting of hormones, growth factors, antibodies, peptides, polypeptides, enzyme immunoglobulins, dyes and biologically active fragments thereof.

15 5. The hybrid polypeptide of claim 1 wherein said starch-encapsulating region is the starch-encapsulating region of an enzyme selected from the group consisting of soluble starch synthase I, soluble starch synthase II, soluble starch synthase III, granule-bound starch synthase, branching enzyme I, branching enzyme IIa, branching enzyme IIBb and glucoamylase polypeptides.

20 6. The hybrid polypeptide of claim 1 comprising a cleavage site between said starch-encapsulating region and said payload polypeptide.

7. A recombinant nucleic acid molecule encoding the hybrid polypeptide of claim 1.

8. The recombinant molecule of claim 7 which is a DNA molecule comprising control sequences adapted for expression of said starch-encapsulating region and said payload polypeptide in a bacterial host.
- 5 9. The recombinant molecule of claim 7 which is a DNA molecule comprising control sequences adapted for expression of said starch-encapsulating region and said payload polypeptide in a plant host.
- 10 10. The recombinant molecule of claim 9 wherein said control sequences are adapted for expression of said starch-encapsulating region and said payload polypeptide in a monocot.
- 10 11. The recombinant molecule of claim 9 wherein said control sequences are adapted for expression of said starch-encapsulating region and said payload polypeptide in a dicot.
12. The recombinant molecule of claim 9 wherein said control sequences are adapted for expression of said starch-encapsulating region and said payload polypeptide in an animal host.
- 15 13. An expression vector comprising the recombinant molecule of claim 7.
14. A cell transformed to comprise the recombinant molecule of claim 7, capable of expressing said DNA molecule.
15. The cell of claim 14 which is a plant cell.
16. A plant regenerated from the cell of claim 15.
- 20 17. A seed from the plant of claim 16 capable of expressing said recombinant molecule.
18. A modified starch derived from cells of claim 14 comprising said payload polypeptide.

19. A method of targeting digestion of a payload polypeptide to a selected site in the digestive system of an animal comprising feeding said animal a modified starch of claim 18 comprising said payload polypeptide in a matrix of a starch selected to be digested in the selected site in the digestive tract.

5 20. A method of producing a pure payload polypeptide from a hybrid polypeptide of claim 1 comprising:

(a) transforming a host organism with DNA encoding said hybrid polypeptide;

(b) allowing said hybrid polypeptide to be expressed in said host;

(c) isolating said hybrid polypeptide from said host;

10 (d) purifying said payload polypeptide from said hybrid polypeptide.